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Hubinette

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(54) **IDENTIFYING NEGATIVE KEYWORDS ASSOCIATED WITH ADVERTISEMENTS**

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G06F 17/30 (2006.01)

(52) **U.S. Cl.** **707/759**; 707/713; 707/721; 707/722; 707/736; 707/769; 707/771; 707/773

(58) **Field of Classification Search** 707/713, 707/721, 722, 736, 759, 769, 771, 773
See application file for complete search history.

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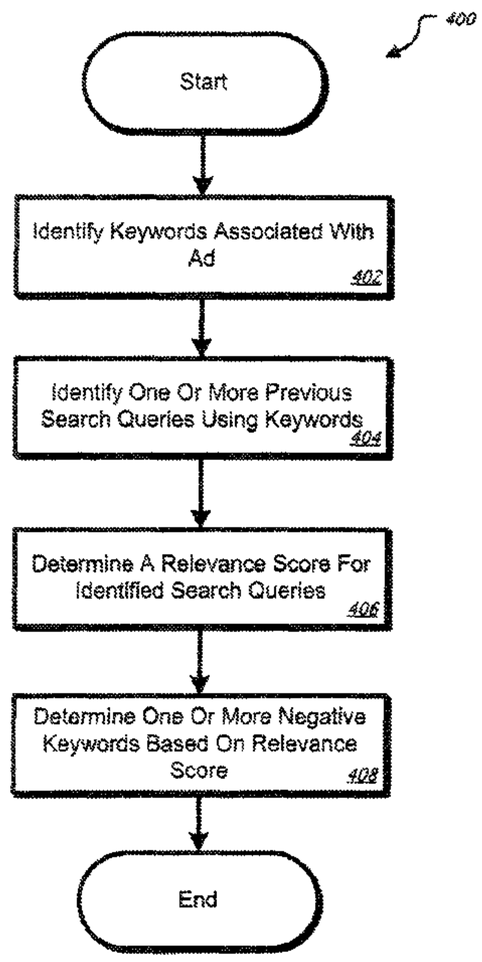
(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57) **ABSTRACT**

The present disclosure includes a system and method for identifying negative keywords associated with advertisements. In some implementations, a method for advertising includes identifying one or more keywords associated with an advertisement. The keywords used to embed the advertisement in Web pages such as those including search results. By scoring keywords to identify those keywords that are not relevant to the web page content, one or more negative keywords can be identified in order to limit the embedding of non-relevant advertisements in web page content.

40 Claims, 6 Drawing Sheets



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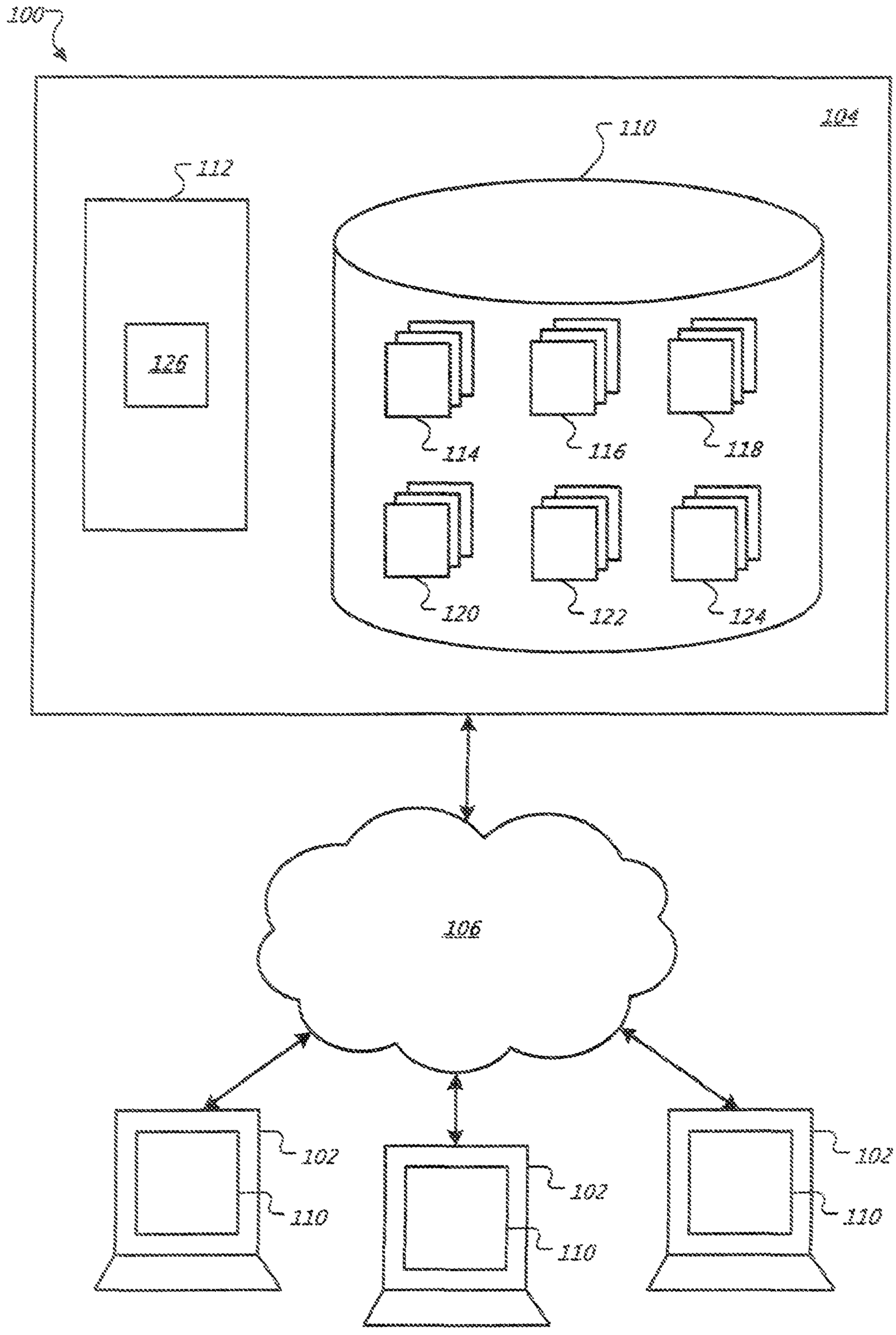

100
104
110
112
126
114
116
118
120
122
124
106
102
110
102
110
102
110

FIG. 1

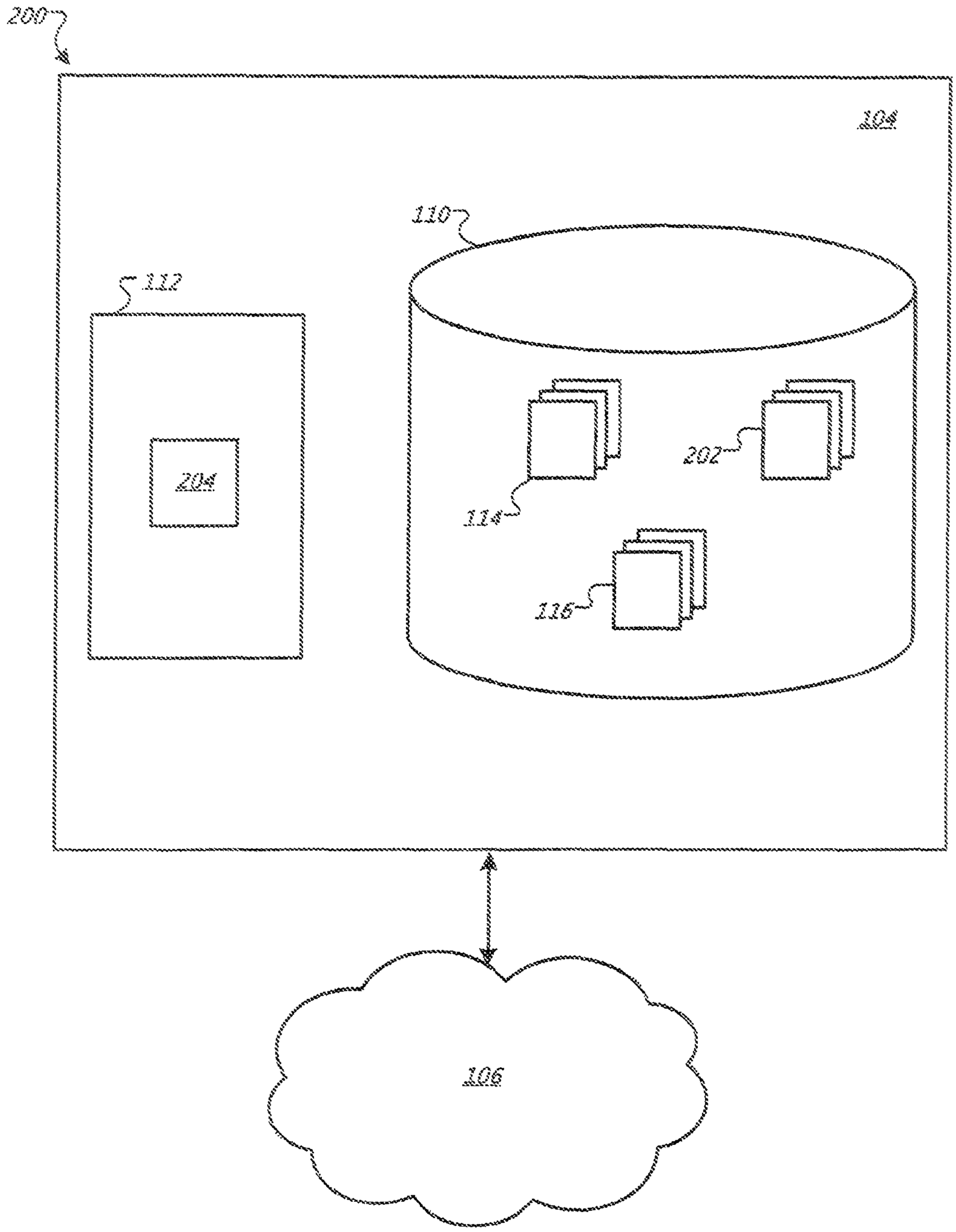


FIG. 2

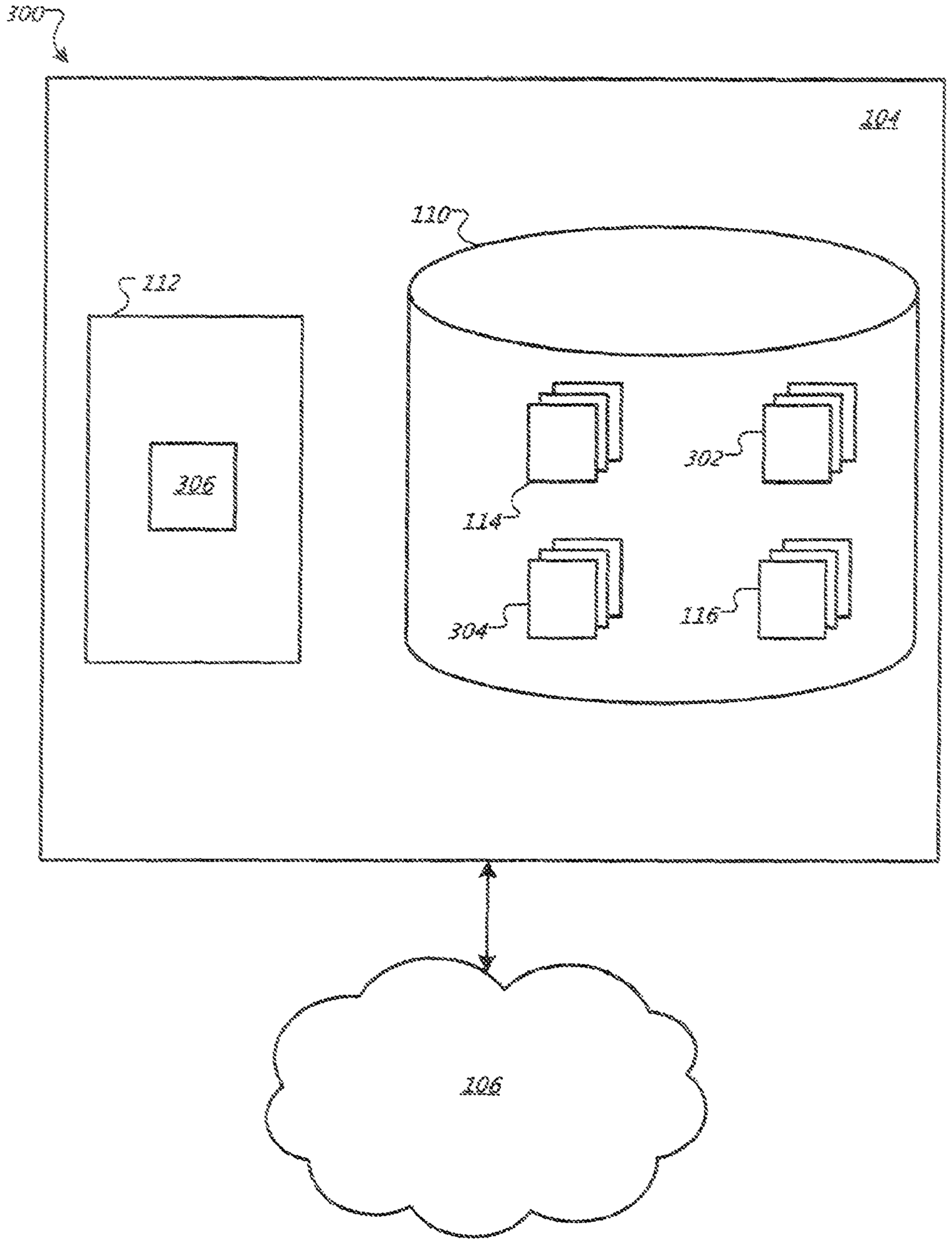


FIG. 3

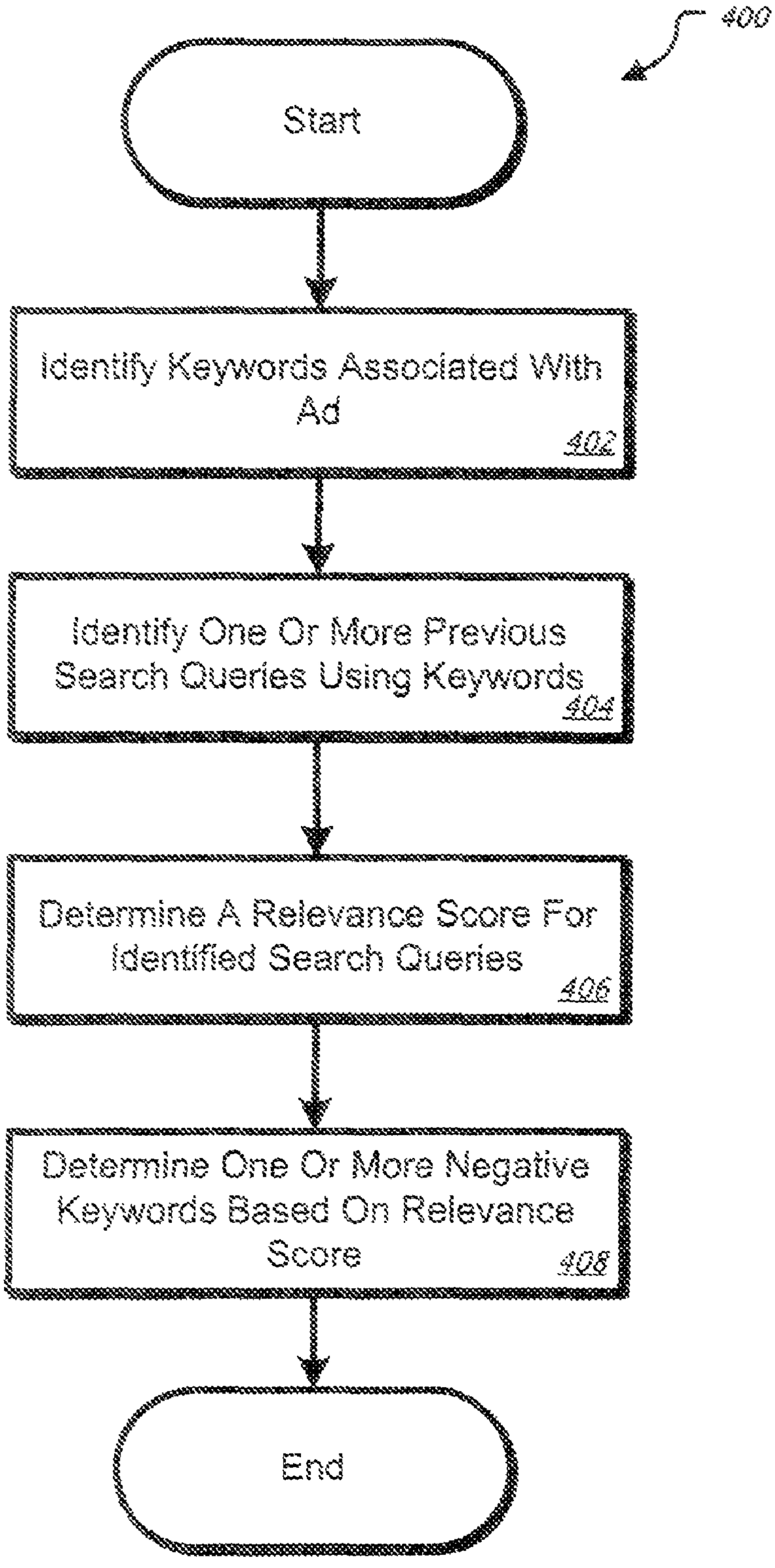

400
Start
Identify Keywords Associated With Ad
402
Identify One Or More Previous Search Queries Using Keywords
404
Determine A Relevance Score For Identified Search Queries
406
Determine One Or More Negative Keywords Based On Relevance Score
408
End

FIG. 4

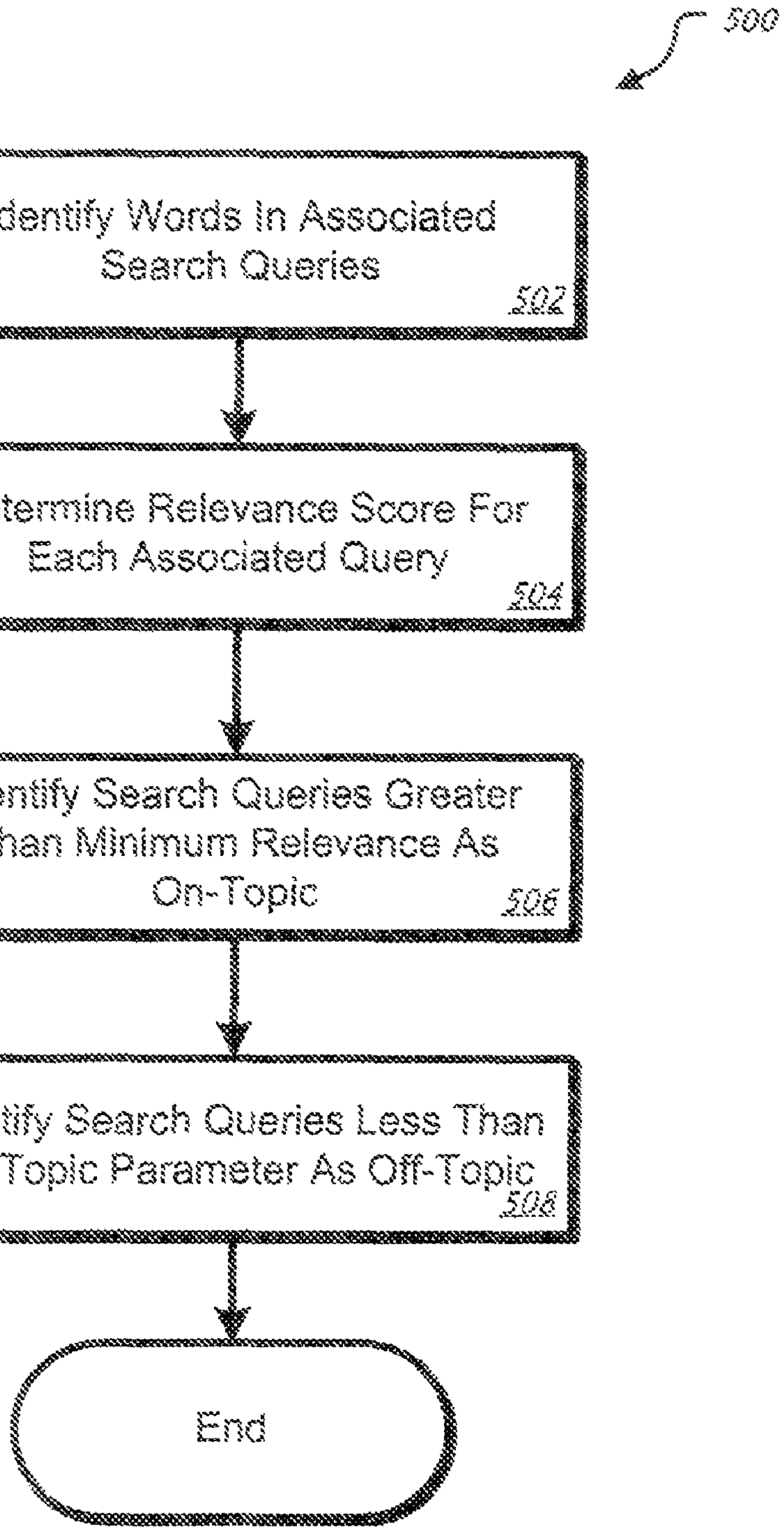

500
Identify Words In Associated Search Queries
502
Determine Relevance Score For Each Associated Query
504
Identify Search Queries Greater Than Minimum Relevance As On-Topic
506
Identify Search Queries Less Than Off-Topic Parameter As Off-Topic
508
End

FIG. 5

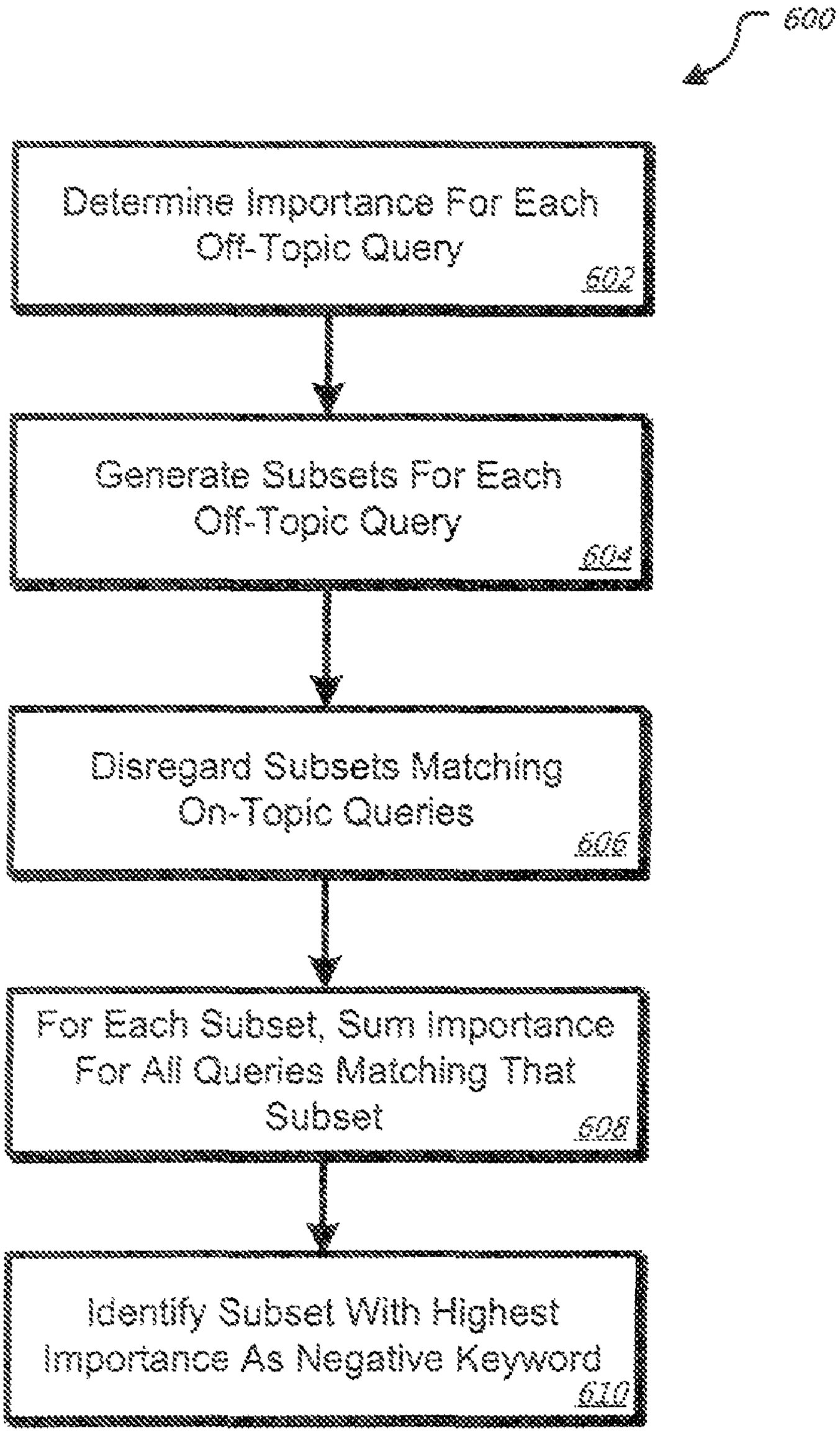

600
Determine Importance For Each Off-Topic Query
602
Generate Subsets For Each Off-Topic Query
604
Disregard Subsets Matching On-Topic Queries
606
For Each Subset, Sum Importance For All Queries Matching That Subset
608
Identify Subset With Highest Importance As Negative Keyword
610

FIG. 6

IDENTIFYING NEGATIVE KEYWORDS ASSOCIATED WITH ADVERTISEMENTS

BACKGROUND

Content delivery over the internet continues to improve every day. Computer users can receive e-mail, news, games, entertainment, music, books, and web pages—all with a simple Internet connection (and with improved quality on a broadband connection). Internet users also have access to a plethora of services such as maps, shopping links, images, blogs, local search, satellite images, group discussions, hosted content, and e-mail. When an Internet user accesses these respective services, the content provided by the service is typically related to a particular topic that can, for example, be divided up into various content categories. By determining the category of content provided to an internet user on a particular service, a service provider can give the Internet user additional content and/or advertisements focused on the category desired by the user, thus improving the user's experience.

For example, on the Internet some content providers include search functionality that is based on keywords entered by the user seeking information. This user query can be an indicator of the type of information of interest to the user. By comparing the user query to a list of keywords specified by an advertiser, it is possible to provide targeted ads to the user. An example of such a system is AdWords™ offered by Google, Inc. (Mountain View, Calif.). An example of such a system is described in part in U.S. Pat. No. 6,816,857, entitled "Meaning-based advertising and document relevance determination," issued Nov. 9, 2004, currently assigned to the assignee of the present application and which is hereby incorporated by reference in its entirety.

Alternatively, a content provider can serve advertisements to a user based on a determination of an advertisement most closely related to Internet content such as a web page. This can be done, for example, by associating the content of the web page to a set of one or more advertising keywords closely related to the page content, and serving targeted ads to a user of that web page. An example of such as a system is the AdSense™ system offered by Google, Inc. (Mountain View, Calif.). An example of such a system is in part described in U.S. Pat. No. 7,136,875, entitled "Serving advertisements based on content," issued Nov. 14, 2006 to the assignee of the present application, and which is hereby incorporated by reference in its entirety.

Further improvement in the targeting of advertisements to content are possible, especially when keywords are broad and can relate to multiple possible topics of interest to a user and an advertiser.

SUMMARY

The present disclosure includes a system and method for identifying negative keywords associated with a content item (e.g., an advertisement or "ad"). In some implementations, a method for advertising includes identifying one or more keywords (such as those derived from search queries or web page content, for example) associated with an advertisement with respect to content. A function is applied to query to compute whether the query is irrelevant to the advertisement and a score is applied to the query. Through the resulting scores, a list of exclusion keywords is determined that represent content items such as advertisements not to be included in results while matching a substantially minimal the number of relevant queries In this manner, one or more search criteria associated with the one or more keywords are evaluated to identify one or more negative keywords.

The details of one or more implementations of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

FIG. **1** is a block diagram illustrating an example system for identifying negative keywords in accordance with some implementations of the present disclosure;

FIG. **2** is a block diagram illustrating an example system for identifying associated search criteria in accordance with some implementations of the present disclosure;

FIG. **3** is a block diagram illustrating another example system for identifying associated search criteria in accordance with some implementations of the present disclosure;

FIG. **4** is a flow diagram illustrating an example method for identifying negative keywords in the system of FIG. **1**.

FIG. **5** is a flow diagram illustrating an example method for identifying off topic search criteria in the system of FIG. **1**; and

FIG. **6** is flow diagram illustrating an example method for identifying negative keywords using off topic search criteria in the system of FIG. **1**.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

FIG. **1** is a block diagram illustrating an example system **100** for automatically identifying negative keywords associated with a content item (e.g., an advertisement or "ad"). By way of example, systems and methods disclosed herein are discussed with reference to the identification of negative keywords associated with an on-line advertisement. The systems and methods disclosed can be used in alternative delivery channels (e.g., not on-line, such as radio) and include other content (e.g., not ads). Negative keywords can include character strings (e.g., words, phrases) in search criteria that negate or otherwise reduce the likelihood that an associated advertisement is selected for display with the corresponding search results. Frequently, advertisements presented with search results are associated with keywords such that the inclusion of one or more keywords in the search criteria results or otherwise increases a likelihood that the advertisement is presented with the search results. In comparison, negative keywords can, alternatively or in combination, be associated with the advertisement such that the inclusion of one or more negative keywords in the search criteria prevents or otherwise reduces the likelihood that the advertisement is presented with the search results. For example, an advertisement for a window cleaning service can include the keyword "clean windows." To reduce, minimize, or decrease presenting the ad with unrelated search results, the word "Microsoft" can be a negative keyword for the advertisement thereby reducing the likelihood that a window cleaning service is advertised with search results related to the Windows operating system. As a result of automatically identifying negative keywords, the system **100**, in some implementations, can thus be used with an advertising service to enhance, maximize, or otherwise increase the relevancy of ads presented with search results in doing so, the system **100** can increase actions rates (e.g., click-through rates) and/or conversions performed in response to presenting the ad.

In some implementations, the system **100** performs one or more of the following: identifying search criteria that can result in presentation of an ad, determining whether search criteria is relevant to the ad, identifying negative keywords in the unrelated search criteria, and/or others. In regards to identifying search criteria, the system **100** can identify a search query that matches keywords associated with the advertisement. For example, the ad can be associated with words and/or phrases, and the system **100** can identify the search criteria that include, match, or otherwise map to at least one of these words and/or phrases. In determining the relevancy of search criteria, the system **100** can determine the relevancy of keywords to an advertisement using any suitable expression such as Bayesian networks. Search criteria determined to be substantially irrelevant to an advertisement may be identified as off-topic queries. After identifying search criteria not relevant to the ad, the system **100** can determine words that occur with a specified frequency within the search criteria as negative keywords. For example, if the system **100** identifies queries "apple tree," "pear tree," and "pecan tree" as irrelevant queries, the system **100** can identify the word "tree" as a negative keyword. In some implementations, the system **100**, after identifying off-topic queries, may determine subsets of terms that reoccur in one or more off-topic search criteria and identify those subsets as negative keywords. Other examples are possible.

Turning to a high level description of the example implementation, the system **100** includes clients **102***a-c* coupled to keyword server **104** through a network **106**. In this implementation, the client **102** includes a Graphical User Interface (GUI) **108** for displaying information associated with negative keywords provided by the keyword server **104**. The keyword server **104** includes a memory **110** and a processor **112**. The memory **110** locally stores a keyword file **114** identifying terms associated with advertisements, associated query files **116** identifying search criteria that can lead to impressions of the advertisements, off-topic queries **118** identifying search criteria substantially irrelevant to the advertisements, models **120** for mapping terms to clusters of related terms, evaluation criteria **122** (typically from user input) identifying criteria for determining off-topic queries using the models **120** and negative keywords using these off-topic queries, and negative keywords **124** identifying negative keywords associated with advertisements. Turning to a high level description of the operation of the system **100**, the evaluation engine **126** determines clusters of related terms associated with keyword files **114** and clusters of related terms associates with the associated query files **116** using the models **120**. Using the keyword clusters and the query clusters, the evaluation engine **126** determines the off-topic queries **118** using the evaluation criteria **122**, such as evaluation criteria obtained from user input. In some implementations, the evaluation engine **126** determines negative keywords **124** based, at least in part, on the off-topic queries **118** and the evaluation criteria **122** such as from user input.

As for a description of the illustrated elements, each client **102** includes or executes at least a GUI **108** and comprises an electronic device (e.g., computing device) operable to receive, transmit, process and store any appropriate data associated with system **100**. It will be understood that there can be any number of clients **102** communicably coupled to the keyword server **104**. Further, "client **102**" and "user" can be used interchangeably as appropriate without departing from the scope of this disclosure. Moreover, for ease of illustration, each client **102** is described in terms of being used by one user. But this disclosure contemplates that many users can use one computer or that one user can use multiple computers.

The keyword server **104** includes a memory **110** and a processor **112**. The memory **110** can be a local memory and include any memory or database module and can take the form of volatile or non-volatile memory including, without limitation, magnetic media, Optical media, random access memory (RAM), read-only memory (ROM), removable media, or any other suitable local or remote memory component. In the illustrated implementation, the memory **110** locally stores keyword files **114**, associated query files **116**, off-topic queries **118**, models **120**, evaluation criteria **122** (typically from user input), and negative keywords **124**. Local memory **110** can also include any other appropriate data, such as VPN applications or services, firewall policies, a security or access log, print or other reporting files, HTML files or templates, data classes or object interfaces, software applications or sub-systems, and others.

The keyword file **114** can include any parameters, variables, algorithms, instructions, rules, objects, or other directives for associating terms and/or phrases with one or more advertisements. In doing so, the keyword file **114** indicates that the associated network ad can be available to present with, for example, search results. Often, an advertiser provides terms and/or phrases related to the goods or services associated with the advertisement. In doing so, a search request including or otherwise associated with the keywords can lead to an impression of the associated advertisement with the search results. In some implementations, the keyword file **114** can be associated with a single advertisement, multiple advertisements, and/or a topic associated with a good and/or service. In some implementations, multiple advertisements can be associated with a single keyword file **114**. In certain implementations, the keyword file **114** can be formatted, stored, or defined as various data structures in text files, eXtensible Markup Language (XML) documents, Virtual Storage Access Method (VSAM) files, flat files, Btrieve files, comma-separated-value (CSV) files, internal variables, or one or more libraries. In short, keyword file **114** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Indeed, some or all of keyword file **114** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

The associated query files **116** includes entries and/or one or more data structures identifying search criteria associated with keyword files **114**. For example, the associated query files **116** can include search criteria that map to or are otherwise associated with keywords of an advertisement. In some implementations, the associated query files **116** include search criteria matching one or more keywords associated with an advertisement. In some implementations, the associated query files **116** can include terms and/or phrase indicative, similar, analogous, related, or otherwise associated with one or more keyword files **114**. Processes for identifying such queries are discussed in more detail with respect to FIGS. **2** and **3**. In some implementations, multiple associated query files **116** can be associated with a single advertisement, multiple advertisements, and/or a topic associated with a good and/or service. In some implementations, multiple advertisements can be associated with a single associated query file **116**. In certain, implementations, the associated query file **116** can be formatted, stored, or defined as various data structures in text files. XML documents. VSAM files, flat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the associated query file **116** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Indeed, some or all of associated query files **116**

can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

Based, at least in part, on the associated query files **116**, the off-topic query files **118** include entries and/or one or more data structures identifying search criteria that are substantially irrelevant to advertised goods and/or services. For example, the off-topic query file **118** can identify the search criteria for "Windows operating system" as substantially irrelevant to a "window cleaning service". In some implementations, the off-topic query files **118** can include terms and/or phrases that do not match a topic of an advertisement. In some implementations, the off-topic query files **118** can be associated with a single advertisement, multiple advertisements, and/or a topic associated with a good and/or service. In some implementations, multiple advertisements can be associated with a single off-topic query file **118**. In certain implementations, the off-topic query files **118** can be formatted, stored, or defined as various data structures in text XML documents, VSAM files, flat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the off-topic query files **118** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Indeed, some or all of off-topic query files **118** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

The models **120** include can include any parameters, variables, algorithms, instructions, rules, objects, or other directives mapping terms and/or phrases to other indicative, similar, analogous, related, or otherwise associated with terms and/or phrases. For example, a model **120** can include information mapping baseball to a cluster, i.e., a group of related terms, that include mitt, bat, hit, run, double, and others. In some implementations, the models **120** merely define or otherwise identify a set of related terms. In this case, a model **120** can be intended to describe a topic and/or semantic concept (e.g., words related to baseball). In addition to terms, the models **120** can include compound words, phrases, and other elements (e.g., a technical paper, a website). In some implementations, the models **120** can be associated with a single topic or multiple topics. In some implementations, multiple topics can be associated with a single model **120**. In certain implementations, the models **120** can be formatted, stored, or defined as various data structures in text files, XML documents, VSAM files, fiat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the models **120** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Indeed, some or all of models **120** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

Evaluation criteria **122** include any parameters, variables, algorithms, instructions, rules, objects or other directives for evaluating search criteria for relevance to advertisements, and is typically based on user input. In some implementations, the evaluation criteria based on user input **122** can be used to identify directives for performing one or more of the following: determining relevancy of search criteria; and determining confidence that a subset of an off-topic query is a negative keyword. In regards to relevancy, the evaluation criteria **122** can identify directives for determining a score associated with search criteria indicating relevance of the search terms to an advertisement, in some implementations, the evaluation criteria **122** can include mathematical and/or logic expressions for determining a relevance score associated with search criteria. For example, the evaluation criteria **122** can include a mathematical expression for determining a conditional probability associated with a user inputted search query or search criteria. In this case, the expression can determine the probably that search criteria occurs within one or more clusters associated with a topic of an advertisement. In the case that the model **120** maps keywords to a set of clusters, the evaluation criteria can include an expression to determine the probability that a term in a search criteria occurs in the set of clusters. In the case that C denotes the set of clusters, the probability of a term can be expressed as P(word|C). In some implementations, P(word|C) corresponds to P(word|on-topic), which can represent the probability that the term is associated with the topic. Based, at least in part, on (word|C), the following expression can be used as a scoring method for a set of K words in a search criteria:

$$\text{Score}(K \mid C) = \frac{1}{|K|} \sum_{K} \log\left(\frac{P(K_n \mid C)}{1 - P(K_n \mid C)}\right)$$

In some implementations, this expression substantially determines an average logarithmic odds that a word occurs in a set of clusters associated with a topic of an advertisement. In this example, P(word|C) increases for words that occur with greater frequency in the associated clusters, and accordingly, Score(K|C) also increases. In some implementations, the computed score can be compared with the probability that the keywords associated with an advertisement occurs in the set of clusters, which can be expressed as P(Keywords Associated with an Ad|C). In one example, the relevance can be determined by the difference as expressed in the following equation:

$$\text{Relevance}(Q|C) = \text{Score}(Q|C) - \text{Score}(\text{Keywords Associated with on } Ad|C)$$

In this example, the relevance of search criteria is determined by the difference in the logarithmic probabilities between search criteria and keywords of an advertisement. In addition, the evaluation criteria **122** can include logical expressions for comparing the determined relevance to one or more parameters. For example, the evaluation criteria **122** can identify an off-topic value such that a relevance score below this value indicates that the search query is not associated with the topic of the advertisement. Also, the evaluation criteria **122** can include a value such that a relevance score above this value indicates that the search query is associated with the topic of the advertisement. The above expressions are merely examples for determining the relevance of search criteria to a topic associated with an advertisement. Accordingly, other mathematical and/or logical expressions can be used to determine relevancy without departing from the scope of this disclosure. In some implementations, the evaluation criteria **122** can identify those search criteria that are not relevant to the topic as negative keywords for the associated advertisement. Such search criteria can be redundant and/or interfere with presenting ads with associated search results. The evaluation criteria **122** can include expressions to identify terms and/or phrases within the off-topic search criteria.

In addition, the evaluation criteria **122** can include expressions to identify subsets in off-topic queries as negative keywords. In some implementations, the evaluation criteria **122** can include the following expression to determine the importance of off-topic queries:

$$\text{Confidence}(Q \mid C) = 1 - e^{MaxOffTopicRelevance - Relevance(Q|C)}$$

$$AdjustedConfidence(Q \mid C) = \begin{cases} \text{Confidence}(Q \mid C)^{LowConfidenceEquation} & ifConfidence(Q \mid C) > 0) \\ \text{Confidence}(Q \mid C) & \text{otherwise} \end{cases}$$

$$\text{Importance}(Q|C) = Q_{hits} * \text{AdjustedConfidence}(Q|C)$$

As indicated in the expressions, the importance can be determined by multiplying a number representing the confidence that a particular search query is not relevant to the keywords of an advertisement by the amount of impressions associated with the keywords of an advertisement. In addition, the low-confidence scores can be further reduced by using an exponent. In the example, the evaluation criteria **122** can include a parameter for the exponent identified as LowConfidenceExponent in the case when the confidence is greater than zero. In this expression, a negative confidence can mean that the search query can be relevant to the keywords of an advertisement. In connection with determining the importance for off-topic search criteria, the evaluation criteria **122** may include directives for identifying subsets in each search query and summing the associated importance for each occurrence of the subset in the identified off-topic searches. In addition, the evaluation criteria **122** may include directives for assigning subsets with the highest importance or an importance above a threshold as negative keywords. As thr thresholds, the evaluation criteria **122** may include, for example, a proximity threshold indicating proximity of a subset to a topic. The above expressions are merely examples for determining the importance of subsets included in search criteria as negative keywords. Accordingly, other similar mathematical and/or logical expressions can be used to determine importance without departing from the scope of this disclosure. In other implementations, the evaluation criteria **122** can be formatted, stored, or defined as various data structures in text files, XML documents, VSAM files, flat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the evaluation criteria **122** can be stored to comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Moreover, evaluation criteria **122** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

The negative keyword files **124** can include entries and/or one or more data structures identifying negative keywords associated with advertisements. As mentioned above, negative keywords can include terms, compounds, phrases, and/or other character strings that prevent or decrease the likelihood that an advertisement is presented with search results. For example, the negative keyword file **124** may include negative keywords such that search criteria that includes one or more of the negative keywords may prevent an associated advertisement being presented with the search results. In some implementations, the negative keyword file **124** can be associated with a single advertisement, multiple advertisements, and/or a topic associated with a good and/or service. In some implementations, multiple advertisements can be associated with a single negative keyword file **124**. In certain implementations, the negative keyword file **124** can be formatted, stored, or defined as various data structures in text files. XML documents, VSAM files, flat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the negative keyword file **124** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Indeed, some or all of negative keyword file **124** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

The processor **112** executes instructions and manipulates data to perform operations of the server **104**. Although FIG. **1** illustrates a single processor **112** in server **104**, multiple processors can be used according to particular needs, and reference to processor **112** is meant to include multiple processors **112** where applicable. In the illustrated implementation, processor **112** executes evaluation engine **126** at any appropriate time such as, for example, in response to a request or input from a user of server **104** or any appropriate computer system coupled with network **106**. Evaluation engine **126** can include any software, hardware, and/or firmware, or combination thereof, operable to evaluate search criteria for negative keywords for advertisements. In evaluating search criteria, the evaluation engine **126** may identify a keyword file **114** and an associated query file **116** for an advertisement and map the keyword and queries to a set of related clusters using one or more models **120**. Using the keyword clusters and the query clusters, the evaluation engine **126** may determine one or more search criteria that are not associated with a topic of the advertisement using the evaluation criteria **122**. In identifying off-topic search criteria, the evaluation engine **126** can perform one or more calculations using the evaluation criteria **122**. For example, the evaluation engine **126** can determine relevance scores associated with search criteria. A score can be assigned based, at least in part, on proximity to a topic associated with an advertisement. In connection with identifying off-topic search criteria, the evaluation engine **126** may identify subsets in the off-topic search criteria as negative keywords. In response to at least identifying the negative keywords, the evaluation engine **126** can generate or update one or more negative keyword files **124**.

Regardless of the particular implementation, "software" can include software, firmware, wired or programmed hardware, or any combination thereof as appropriate. Indeed, evaluation engine **126** can be written or described in any appropriate computer language including C, C++, Java, J#, Visual Basic, assembler, Perl, PHP, as well as others. It will be understood that while the evaluation engine **126** is illustrated in FIG. **1** as including individual modules, the evaluation engine **126** can include numerous other sub-modules, or can instead be a single multi-tasked module that implements the various features and functionality through various objects, methods, or other processes. Further, while illustrated as internal to the keyword server **104**, one or more processes associated with the evaluation engine **126** can be stored, referenced, or executed remotely. Moreover, the evaluation engine **126** can be a child or sub-module of another software module or enterprise application (not illustrated) without departing from the scope of this disclosure.

The network **106** facilitates wireless or wireline communication between the keyword server **104** and any other local or remote computer, such as the client **102**. The network **106** can be all or a portion of an enterprise or secured network. While illustrated as single network, the network **106** can be a continuous network logically divided into various sub-nets or virtual networks without departing from the scope of this disclosure, so long as at least portion of the network **106** can facilitate communications of the ads **116** between the keyword server **104** and the client **102**. In some implementations, the network **106** encompasses any internal or external network, networks, sub-network, or combination thereof operable to facilitate communications between various components in the system **100**. The network **106** can communicate,

for example, Internet Protocol (IP) packets, Frame Relay frames, Asynchronous Transfer Mode (ATM) cells, voice, video, data, and other suitable information between network addresses. The network **106** can include one or more local area networks (LANs), radio access networks (RANs), metropolitan area networks NANO, wide area networks (WANs), all or a portion of the global computer network known as the Internet, and/or any other communication system or systems at one or more locations.

As an example, an ad for a window cleaning service can advertise using the following keyword phrases: window washer, window cleaner, or tall building window washer. The system **100** can identify, using these initial keywords, a list of queries which can result in the window cleaning service advertisement being presented. For example, the query phrases window washer, window cleaner, window registry cleaner or window washer service can lead to ad impressions when displaying search results. The system **100** can then use evaluation criteria **122** to score the above queries using, for example, various functions. For example, the query phrases window washer, window cleaner, or window washer service can be scored high, whereas the query phrase window registry cleaner is scored low because the content is unrelated to the topic of the advertisement. Thereafter, the system **100** can determine negative keywords **124** using these scores, in addition, the system **100** may identify subsets of words (phrases etc.) associated with the negative keywords **124** using the evaluation criteria **122**. In this example, an identified negative keyword **122** can be registry.

FIGS. **2** and **3** illustrate an example system **200** and **300**, respectively, for automatically identifying queries associated with keywords of an advertisement. In the illustrated examples, the system **200** identifies queries resulting in impressions of the advertisement, and the system **300** identifies associated queries independent of such historical data. While illustrated as separate systems, the features and functions of the illustrated systems **200** and **300** can be combined without departing from the scope of this disclosure.

Referring to FIG. **2**, the system **200** can use prior search criteria to identify a subset of queries resulting in the impression an advertisement. In combination with some of the elements in FIG. **1**, the memory **110** includes search log files **202** for identifying previous searches and the processor **112** includes a query engine **204** for identifying associated queries using the search log files **202**. The search log files **202** include one or more data structures or entries that identify or include prior search criteria and associated ad impressions. For example, the search log file **202** can include or identify search criteria and ads displayed with the associated search results. In some implementations, the search log files **202** can be formatted, stored, or defined as various data structures in text files, XML documents, VSAM files, fiat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the log files **202** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Moreover, the log files **202** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

The query engine **204** can include any software, hardware, and/or firmware operable to identify search criteria resulting in ad impressions. For example, the query engine **204** may identify search criteria in the log files **202** that can result in the impression of an advertisement. In some implementations, the query engine **204** identifies search criteria that includes one or more keywords of the advertisement. Alternatively or in combination, the query engine **204** identifies search criteria related to the one or more keywords of the advertisement. For example, the search criteria may include terms that are similar, analogous, related to the same topic, or otherwise associated with one or more keywords of the advertisement. The query engine **204** may limit the evaluation of search criteria to a certain period of time (e.g., 30 days).

In one aspect of operation, the query engine **204** identifies one or more log files **202** associated with a period of time. The query engine **204** identifies those search criteria that resulted in impressions of an advertisement. Based, at least in part, on the identified search criteria, the query engine **204** generates or updates one or more associated query files **116**.

Referring to FIG. **3**, the system **300** can use prior search criteria to identify those queries that could have lead to an impression of an advertisement. For example, the system **300** may evaluate historical search criteria to identify negative keywords without relying on search criteria that resulted in an actual impression of an ad. In doing so, the system **300** may not rely on historical data associated with an ad to identify negative keywords.

In combination with some of the elements in FIG. **1**, the memory **110** includes reverse lookup tables **302** and search log files **304**. In this implementation, the processor **112** includes a mapping engine **306**. The reverse lookup tables **302** can include any parameters, variables, algorithms, instructions, rules, objects or other directives for mapping keywords to other keywords. More specifically, the reverse look-up tables **302** can be used to identify, from a given keyword, other related keywords. Generally, the reverse look-up tables **302** can be used to broaden a given keyword and identify related search criteria even in cases when the search criteria does not include one of the keywords. For example, a givenkeyword may be associated with (i.e., mapped using the reverse look-up tables) to a set of words related to the same topic. The reverse lookup tables **302** include directives, links, associations or the like for reversing this mapping processes to identify additional keywords. In some implementations, the reverse lookup tables **302** can be formatted, stored, or defined as various data structures in text files, XML documents, VSAM files, flat files, Btrieve files, CSV files, internal variables, or one or more libraries. In short, the reverse lookup tables **302** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Moreover, the reverse lookup tables **302** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data. One example of a system that provides relationships between keywords is provided in, for example, U.S. patent application Ser. No. 10/676,571, filed Sep. 30, 2003, entitled "Method and Apparatus for Characterizing Documents Based on Clustering of Related Words," assigned to the assignee of the present application and hereby incorporated by reference in its entirety.

The search log files **304** include one or more data structures or entries that identify or include prior search criteria and associated ad impressions. For example, the search log file **304** can include or identify search criteria and one or more ads displayed with the associated search results. In some implementations, the search log files **304** can be formatted, stored, or defined as various data structures in text files, XML documents, VSAM files, flat flies, Btrieve files, CSV files, internal variables, or one or more libraries, ha short, the log files **304** can comprise one table or file or a plurality of tables or files stored on one computer or across a plurality of computers in any appropriate format. Moreover, the log files **304** can be local or remote without departing from the scope of this disclosure and store any type of appropriate data.

The mapping engine **306** can include any software, hardware, and/or firmware operable to identify search criteria associated with keywords. For example, the query engine **204** may identify search criteria in the log files **304** that include one or more of the keywords. In general, the mapping engine **306** performs one or more of the following: identifying previous search criteria including one or more of the keywords and/or mapping keywords located in the previous search criteria to other keywords using the reverse lookup index **302**.

In one aspect of operation, the mapping engine **306** identifies one or more keyword files **114** associated with an advertisement. Using terms and/or phrases included in the identified keyword files **114**, the mapping engine **306** maps the keywords to other keywords using the reverse lookup index **304**. The mapping engine **306** identifies previous search criteria including either the initial and/or mapped keywords. Based, at least in part, on the identified search criteria, the mapping engine **306** generates or updates one or more associated query files **116**.

FIG. **4** is a flow diagram illustrating an example method **400** for identifying negative keywords in the system of FIG. **1**. Generally, method **400** describes an example technique for evaluation engine **126** to determine negative keywords based on previous search criteria. The following descriptions will primarily focus on the operation of the evaluation engine **126** in performing this method. But system **100** contemplates using any appropriate combination and arrangement of logical elements implementing some or all of the described functionality.

At a high level, method **400** performs two processes: (1) identify keywords associated with ads and search criteria in steps **402** and **404**; and (2) assign a relevance score to determine negative keywords for the search criteria in steps **406** and **408**. Method **400** begins in step **402** where keywords associated with one or more advertisements are identified. For example, the evaluation engine **126** can identify keywords initially provided by an advertiser for a particular advertisement. Next, one or more previous search criteria using the keywords are identified at step **404**. For example, the evaluation engine **126** can identify, using the initial keywords, search criteria that would invoke presentation of the advertisement. At step **406**, a relevance score is determined for one or more (i.e., all identified search criteria located in step **404**) of the identified search criteria. For example, the evaluation engine **126** can determine the relevance score using mathematical and/or logical expressions that analyze the search query for the presence or absence of specific query term(s), term frequency, popularity of the documents (e.g., a query independent score of the document's importance or popularity or interconnectedness), proximity of the query terms to each other, proximity of terms to topic of the advertisement, context, attributes, and others to categorize the relevance of the queries.

New turning to the process of determining negative keywords, in step **408**, one or more negative keywords are determined based, at least in part, on the assigned relevance scores from step **406**. For example, the evaluation engine **126** can identify those terms with relatively low relevance scores and identify those terms as negative keywords. In doing so, the evaluation engine **126** can generate or update the negative keywords **122** in accordance with the determination.

FIG. **5** is a flow diagram illustrating an example method **500** for identifying off-topic queries in system **100** of FIG. **1**. Generally, method **500** describes an example technique for evaluation engine **126** to determine off-topic search criteria based on proximity to a topic of an advertisement. The following descriptions will primarily focus on the operation of evaluation engine **126** in performing this method. But system **100** contemplates using any appropriate combination and arrangement of logical elements implementing some or all of the described functionality.

Method **500** begins at step **502** where words included in search criteria associated with keywords of an advertisement are identified. At **504**, a relevance score is determined for each of the associated search criteria. Search criteria having a relevance score greater than a minimum relevancy parameter are identified as on-topic at step **506**. Next, at step **508**, search criteria with a relevance score less than an off-topic parameter are identified as off-topic.

FIG. **6** is a flow diagram illustrating an example method **600** for identifying negative keywords using subsets of the off-topic search criteria of FIG. **1**. Generally, method **600** describes an example technique for evaluation engine **126** to determine negative keywords based on proximity to a topic of an advertisement. The following descriptions will primarily focus on the operation of evaluation engine **126** in performing this method. But system **100** contemplates using any appropriate combination and arrangement of logical elements implementing some or all of the described functionality.

Method **600** begins at step **602** where an importance value is determined for each off-topic query. Next, at step **604**, subsets of words are generated for each off-topic query. Subsets matching on-topic queries are disregarded at step **606**. For each subset, the importance for all queries matching that subset can be evaluated (e.g., summed, aggregated) at step **608**. One or more subsets having scores above a threshold can be identified as a negative keyword at step **610**. For example, a proximity threshold may be used to identify a subset's proximity to a topic of an advertisement. In one implementation, only the subset having the highest importance is identified as a negative keyword.

A number of implementations of the invention have been described. Nevertheless, it will be understood that various modifications can be made without departing from the spirit and scope of the invention. For example, the systems and methods in this disclosure can include inquiring about keywords or negative keywords to a user or another advertiser in the same field rather than determining the keywords and negative keywords. Accordingly, other implementations are within the scope of the following claims.

What is claimed is:

1. A computer-implemented method, comprising:

identifying a content item, the content item being associated with one or more keywords that are used in determining whether to embed the content item in web pages including search results;

extracting from a search log a plurality of previously-submitted search criteria that have resulted in presentation of the content item in respective search result web pages for the search criteria due to respective associations between the search criteria and the keywords of the content item;

identifying, from among the plurality of previously-submitted search criteria, at least one search criterion that is irrelevant to a topic of the content item, based on one or more evaluation criteria; and

evaluating, by one or more processors, respective recurrences of terms in the at least one irrelevant search criterion to identify a partial subset of the terms as one or more negative keywords for the content item,

wherein identifying the at least one irrelevant search criterion is further based on at least on metrics representing probabilities that terms of each of the plurality of previ-

ously-submitted search criteria occurs within one or more keyword clusters of the content item.

2. The method of claim **1**, wherein identifying the at least one irrelevant search criterion is based at least in part on proximity of each of the plurality of previously-submitted search criteria to the topic of the content item.

3. The method of claim **1**, wherein identifying the at least one irrelevant search criterion is based at least on user input representing user actions performed with respect to the content item.

4. The method of claim **1**, further comprising:

determining a respective metric associated with each of one or more subsets of terms of each of the plurality of previously-submitted search criteria based, at least in part, on probabilities that the subset of terms occurs within the keyword clusters associated with the content item;

aggregating the respective metrics associated with the subsets of terms of each of the previously-submitted search criteria to obtain a respective aggregated metric for the previously-submitted search criterion; and

determining, for each of the plurality of previously-submitted search criteria, a respective proximity to the topic associated with the content item based, at least in part, on the respective aggregated metric of the previously-submitted search criterion.

5. The method of claim **4**, further comprising:

identifying at least one proximity threshold associated with the topic of the content item; and

wherein identifying the at least one irrelevant search criterion is in response to at least the respective proximity of the at least one irrelevant search criterion violating the at least one proximity threshold.

6. The method of claim **1**, wherein evaluating respective recurrences of terms in the at least irrelevant search criterion to identify the partial subset of the terms as one or more negative keywords for the content item further comprises:

identifying one or more terms that reoccur in the at least one irrelevant search criterion but are absent in other search criteria in the plurality of previously-submitted search criteria that have not been determined to be irrelevant to the topic of the content item; and

selecting the partial subset of the terms from the identified one or more recurring terms.

7. The method of claim **6**, wherein selecting the partial subset of the terms from the identified one or more recurring terms further comprises:

for each of the one or more recurring terms:

aggregating respective metrics associated with one or more of the at least one irrelevant search criterion that include the recurring term to obtain an aggregated metric;

comparing the aggregated metrics with a threshold value; and

identifying the recurring term as one of the one or more negative keywords for the content item in response to the aggregated metric violating the threshold value.

8. The method of claim **7**, wherein the respective metric associated with each of the at least one irrelevant search criterion is based at least on a measure of non-relevance of the search criterion relative to a keyword of the content item and an amount of impressions associated with the keyword of the content item.

9. A non-transitory computer-readable medium having instructions stored thereon, which, when executed by at least one processor, cause the processor to perform operations comprising:

identifying a content item, the content item being associated with one or more keywords that are used in determining whether to embed the content item in web pages including search results;

extracting from a search log a plurality of previously-submitted search criteria that have resulted in presentation of the content item in respective search result web pages for the search criteria due to respective associations between the search criteria and the keywords of the content item;

identifying, from among the plurality of previously-submitted search criteria, at least one search criterion that is irrelevant to a topic of the content item, based on one or more evaluation criteria; and

evaluating respective recurrences of terms in the at least one irrelevant search criterion to identify a partial subset of the terms as one or more negative keywords for the content item,

wherein identifying the at least one irrelevant search criterion is further based at least on metrics representing probabilities that terms of each of the plurality of previously-submitted search criteria occur within one or more keyword clusters of the content item.

10. The computer-readable medium of claim **9** wherein identifying the at least one irrelevant search criterion is based at least in part on proximity of each of the plurality of previously-submitted search criteria to the topic of the content item.

11. The computer-readable medium of claim **9**, wherein identifying the at least one irrelevant search criterion is based at least on user input representing user actions performed with respect to the content item.

12. The computer-readable medium of claim **9**, wherein the operations further comprise:

determining a respective metric associated with each of one or more subsets of terms of each of the plurality of previously-submitted search criteria based, at least in part, on probabilities that the subset of terms occurs within the keyword clusters associated with the content item;

aggregating the respective metrics associated with the subsets of terms of each of the plurality of previously-submitted search criteria to obtain a respective aggregated metric for the previously-submitted search criterion; and

determining, for each of the plurality of previously-submitted search criteria, a respective proximity to the topic associated with the content item based, at least in part, on the aggregated metrics of the previously-submitted search criterion.

13. The computer-readable medium of claim **12**, wherein the operations further comprise:

identifying at least one proximity threshold associated with the topic of the content item; and

wherein identifying the at least one irrelevant search criterion is in response to at least the respective proximity of the at least one irrelevant search criterion violating the at least one proximity threshold.

14. The computer-readable medium of claim **9**, wherein evaluating respective recurrences of terms in the at least one irrelevant search criterion to identify the partial subset of the terms as one or more negative keywords for the content item further comprises:

identifying one or more terms that reoccur in the at least one irrelevant search criterion but are absent in other search criteria in the plurality of previously-submitted

search criteria that have not been determined to be to the topic of the content item; and

selecting the partial subset of the terms from the identified one or more recurring terms.

15. The computer-readable medium of claim **14**, wherein selecting the partial subset of the terms from the identified one or more recurring terms further comprises:

for each of the one or more recurring terms:

aggregating respective metrics associated with one or more of the at least one irrelevant search criterion that include the recurring term;

comparing the aggregated metrics with a threshold value; and

identifying the recurring term as one of the one or more negative keywords for the content item in response to the aggregated metric violating the threshold value.

16. The computer-readable medium of claim **15**, wherein the respective metric associated with each of the at least one irrelevant search criterion is based at least on a measure of non-relevance of the search criterion relative to a keyword of the content item and an amount of impressions associated with the keyword of the content item.

17. A server for identifying negative keywords, comprising one or more processors, a memory coupled to the one or more processors, and a network interface, comprising:

means for identifying a content item, the content item being associated with one or more keywords that are used in determining whether to embed the content item in web pages including search results;

means for extracting from a search log a plurality of previously-submitted search criteria that have resulted in presentation of the content item in respective search result web pages for the search criteria due to respective associations between the search criteria and the keywords of the content item;

means for identifying, from among the plurality of previously-submitted search criteria, at least one search criterion that is irrelevant to a topic of the content item, based on one or more evaluation criteria; and

means for evaluating respective recurrences of terms in the at least one irrelevant search criterion to identify a partial subset of the terms as one or more negative keywords for the content item,

wherein identifying the at least one irrelevant search criterion is further based on at least metrics representing probabilities that terms of each of the plurality of previously-submitted search criteria occur within one or more keyword clusters of the content item.

18. The server of claim **17**, wherein identifying the at least one irrelevant search criterion is based at least in part on proximity of each of the plurality of previously-submitted search criteria to the topic of the content item.

19. The server of claim **17**, wherein identifying the at least one irrelevant search criterion is based at least on user input representing user actions performed with respect to the content item.

20. The server of claim **17**, further comprising:

means for determining a respective metric associated with each of one or more subsets of terms of each of the plurality of previously-submitted search criteria based, at least in part, on probabilities that the subset of terms occurs within the keyword clusters associated with the content item;

means for aggregating the respective metrics associated with the subsets of terms of each of the plurality of previously-submitted search criteria to obtain a respective aggregated metric for the previously-submitted search criterion; and

means for determining, for each of the plurality of previously-submitted search criteria, a respective proximity to the topic associated with the content item based, at least in part, on the aggregated metrics of the previously-submitted search criterion.

21. The server of claim **20**, further comprising:

means for identifying at least one proximity threshold associated with the topic of the content item; and

wherein identifying the at least one irrelevant search criterion is in response to at least the respective proximity of the at least one irrelevant search criterion violating the at least one proximity threshold.

22. The server of claim **17**, wherein the means for evaluating respective recurrences of terms in the at least one irrelevant search criterion to identify the partial subset of the terms as one or more negative keywords for the content item further comprises:

means for identifying one or more terms that reoccur in the at least one irrelevant search criterion but are absent in other search criteria in the plurality of previously-submitted search criteria that have not been determined to be irrelevant to the topic of the content item; and

means for selecting the partial subset of the terms from the identified one or more recurring terms.

23. The server of claim **22**, wherein the means for selecting the partial subset of the terms from the identified one or more recurring terms further comprises:

for each of the one or more recurring terms:

means for aggregating respective metrics associated with one or more of the at least one irrelevant search criterion that include the recurring term to obtain an aggregated metric;

means for comparing the aggregated metrics with a threshold value; and

means for identifying the recurring term as one of the one or more negative keywords for the content item in response to the aggregated metric violating the threshold value.

24. The server of claim **23**, wherein the respective metric associated with each of the at least one irrelevant search criterion is based at least on a measure of non-relevance of the search criterion relative to a keyword of the content item and an amount of impressions associated with the keyword of the content item.

25. A system, comprising:

one or more processors; and

memory having instructions stored thereon, the instructions, when executed by the one or more processors, cause the one or more processors to perform operations comprising:

identifying a content item, the content item being associated with one or more keywords that are used in determining whether to embed the content item in web pages including search results;

extracting from a search log a plurality of previously-submitted search criteria that have resulted in presentation of the content item in respective search result web pages for the search criteria due to respective associations between the search criteria and the keywords of the content item;

identifying, from among the plurality of previously-submitted search criteria, at least one search criterion that is irrelevant to a topic of the content item, based on one or more evaluation criteria; and

evaluating respective recurrences of terms in the at least one irrelevant search criterion to identify a partial subset of the terms as one or more negative keywords for the content item,

wherein identifying the at least one irrelevant search criterion is further based at least on metrics representing probabilities that terms of each of the plurality of previously-submitted search criteria occur within one or more keyword clusters of the content item.

26. The system of claim **25**, wherein identifying the at least one irrelevant search criterion is based at least in part on proximity of each of the plurality of previously submitted search criteria to the topic of the content item.

27. The system of claim **25**, wherein identifying the at least one irrelevant search criterion is based at least on user input representing user actions performed with respect to the content item.

28. The system of claim **25**, wherein the operations further comprise:

determining a respective metric associated with each of one or more subsets of terms of each of the plurality of previously-submitted search criteria based, at least in part, on probabilities that the subset of terms occurs within the keyword clusters associated with the content item;

aggregating the respective metrics associated with the subsets of terms of each of the previously-submitted search criteria to obtain a respective aggregated metric for the previously-submitted search criterion; and

determining, for each of the plurality of previously-submitted search criteria, a respective proximity to the topic associated with the content item based, at least in part, on the respective aggregated metric of the previously-submitted search criterion.

29. The system of claim **28**, wherein the operations further comprise:

identifying at least one proximity threshold associated with the topic of the content item; and

wherein identifying the at least one irrelevant search criterion is in response to at least the respective proximity of the at least one irrelevant search criterion violating the at least one proximity threshold.

30. The server of claim **25**, wherein evaluating respective recurrences of terms in the at least one irrelevant search criterion to identify the partial subset of the terms as one or more negative keywords for the content item further comprises:

identifying one or more terms that reoccur in the at least one irrelevant search criterion but are absent in other search criteria in the plurality of previously-submitted search criteria that have not been determined to be irrelevant to the topic of the content item; and

selecting the partial subset of the terms from the identified one or more recurring terms.

31. The system of claim **30**, wherein selecting the partial subset of the terms from the identified one or more recurring terms further comprises:

for each of the one or more recurring terms:

aggregating respective metrics associated with one or more of the at least one irrelevant search criterion that include the recurring term to obtain an aggregated metric;

comparing the aggregated metric with a threshold value; and

identifying the recurring term as one of the one or more negative keywords for the content item in response to the aggregated metric violating the threshold value.

32. The system of claim **30**, wherein the respective metric associated with each of the at least one irrelevant search criterion is based at least on a measure of non-relevance of the search criterion relative to a keyword of the content item and an amount of impressions associated with the keyword of the content item.

33. A computer-implemented method, comprising:

identifying a content item, the content item being associated with one or more keywords that are used for targeting delivery of the content item;

extracting from a search log a plurality of previously-submitted search keywords that have been resolved to the content item;

identifying, from among the plurality of previously submitted search keywords, multiple search criteria that are irrelevant to a topic of the content item, based on metrics representing probabilities that terms of each of the plurality of previously-submitted search keywords occur within one or more keyword clusters of the content item; and

evaluating respective recurrences of terms in the multiple irrelevant search criteria to identify a partial subset of the terms as one or more negative keywords for the content item.

34. The method of claim **33**, wherein identifying the multiple irrelevant search criteria is based at least in part on proximity of each of the plurality of previously-submitted search criteria to the topic of the content item.

35. The method of claim **33**, wherein identifying the multiple irrelevant search criteria is based at least on user input representing user actions performed with respect to the content item.

36. The method of claim **33**, further comprising:

determining a respective metric associated with each of one or more subsets of terms of each of the plurality of previously-submitted search criteria based, at least in part, on probabilities that the subset of terms occurs within the keyword clusters associated with the content item;

aggregating the respective metrics associated with the subsets of terms of each of the plurality of previously-submitted search criteria to obtain a respective aggregated metric for the previously-submitted search criterion; and

determining, for each of the plurality of previously-submitted search criteria, a respective proximity to the topic associated with the content item based, at least in part, on the respective aggregated metric of the previously-submitted search criterion.

37. The method of claim **36**, further comprising:

identifying at least one proximity threshold associated with the topic of the content item; and

wherein identifying the multiple irrelevant search criteria is in response to at least the respective proximities of the multiple irrelevant search criteria violating the at least one proximity threshold.

38. The method of claim **33**, wherein evaluating respective recurrences of terms in the multiple irrelevant search criteria to identify the partial subset of the terms as one or more negative keywords for the content item further comprises:

identifying one or more terms that reoccur in the multiple irrelevant search criteria but are absent in other search criteria in the plurality of previously-submitted search criteria that have not been determined to be irrelevant to the topic of the content item; and

selecting the partial subset of the terms from the identified one or more recurring terms.

39. The method of claim 38, wherein selecting the partial subset of the terms from the identified one or more recurring terms further comprises:

for each of the one or more recurring terms:

aggregating respective metrics associated with one or more of the multiple irrelevant search criteria that include the recurring term to obtain an aggregated metric;

comparing the aggregated metric with a threshold value; and

identifying the recurring term as one of the one or more negative keywords for the content item in response to the aggregated metric violating the threshold value.

40. The method of claim 38, wherein the respective metric associated with each of the multiple irrelevant search criteria is based at least on a measure of non-relevance of the search criterion relative to a keyword of the content item and an amount of impressions associated with the keyword of the content item.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 8,229,942 B1
APPLICATION NO. : 11/736452
DATED : July 24, 2012
INVENTOR(S) : Carl F. Hubinette

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 12, line 66, claim 1, please delete “on at least” and insert therefor -- at least --;

Column 13, line 1, claim 1, please delete “occurs” and insert therefor -- occur --;

Column 13, line 35, claim 6, please delete “irrelevant” and insert therefor -- one irrelevant --;

Column 13, line 53, claim 7, please delete “metrics” and insert therefor -- metric --;

Column 14, line 25, claim 10, please delete “claim 9” and insert therefor -- claim 9, --;

Column 14, line 50, claim 12, please delete “metrics” and insert therefor -- metric --;

Column 15, line 1, claim 14, please delete “to be” and insert therefor -- to be irrelevant --;

Column 16, line 7, claim 20, please delete “metrics” and insert therefor -- metric --;

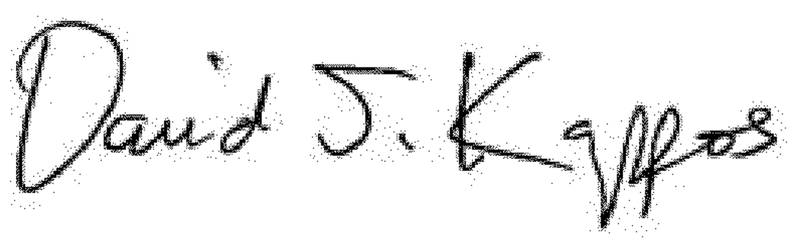
Column 16, line 36, claim 23, please delete “metrics” and insert therefor -- metric --;

Column 17, line 12, claim 26, please delete “previously submitted” and insert therefor
-- previously-submitted --;

Column 17, line 44, claim 30, please delete “server” and insert therefor -- system --; and

Column 18, lines 14-15, claim 33, please delete “previously submitted” and insert therefor
-- previously-submitted --.

Signed and Sealed this
Second Day of October, 2012



David J. Kappos
Director of the United States Patent and Trademark Office